

Full Spectrum Color Detecting Pixel Camera

What is claimed is:

1. In a specific embodiment, the invention provides a method of capturing the spectral content of an image. In this embodiment, the method includes:

5

a. segmenting the image into an array of pixels, each pixel associated with a distinct spectral energy function signature of the image;

10

b. separately directing the spectral energy element of each pixel to a spectral energy dispersion device that spreads the energy function into a continuous spectrum representative of an entire spectrum of interest; and

15

c. for each pixel, functioning as a spectrum analyzer, determining an amplitude value for each of the resolved spectral components.

2. In a further related embodiment, the spectral energy dispersion device in claim 1 is implemented as part of a spectrophotometer.

20

3. In an additional related embodiment, determining an amplitude value for each of the spectral components in claim 1 includes using a linear array of photo-detectors to evaluate the output of the spectrophotometer.

25

4. In a further related embodiment in claim 3 a modulated flexible grating is utilized to detect smaller wavelength bandwidth by jittering or stressing the grating.

These embodiments are capable of capturing the entire spectral energy content of a scene imaged onto the pixel sensors. The spectrum covered, depending on the parameters of the spectral separator and spectrophotometer described herein, may span from the x-ray region, through the ultraviolet, the visible,

30

Full Spectrum Color Detecting Pixel Camera

to the far infrared. Other related embodiments include an apparatus that implements the above methods.